COMP/BIOC 571 BIOINFORMATICS: SEQUENCE ANALYSIS
Spring 2013

Draft syllabus as of Nov '12

Staff

	Instructor
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Office hours	by appointment, ABL 201

Course Information

- **MEETING PLACE AND TIME:** ???, Tuesday and Thursday, 1–2:15 p.m.
- **TEXTBOOK:**
  - **[UB]** "**Understanding Bioinformatics**", by M. Zvelebil and J.O. Baum. Published by Garland Science, 2008. (get it used!)

- **HIGHLY RECOMMENDED BOOKS: (list in progress, will change)**
  - Inferring Phylogenies, by Felsenstein.
  - Fundamentals of Molecular Evolution, by Graur and Li.
  - Theoretical Evolutionary Genetics, by Felsenstein (PDF available online).
  - Evolutionary Theorey: Mathematical and Conceptual Foundations, by Rice.
- **SOFTWARE:** here are links to programs (Matlab toolboxes included) that may be useful for homework tasks, and beyond:
  1. The **Molecular Biology and Evolution** toolbox. Click here for a paper that describes the tool.
  2. The **Population Genetics and Evolution** toolbox.
  3. The ms tool for generating samples under neutral models.
  4. For a comprehensive list of phylogeny programs, please see the website maintained by Prof. Joe Felsenstein here.
- **INTENDED AUDIENCE:** anyone who's interested in learning about exciting developments at the intersection of evolutionary biology and computing. Knowledge of biology, math, and computer science is a plus; the course will progress from the basics of relevant biology to a high level of algorithms development.

- **TOPICS TO BE COVERED: (see *Understanding Bioinformatics*)**
  1. Sequence Alignment
     - Pairwise and multiple
     - Phylogenetic reconstruction
  2. Phylogenetic Trees
     - Construction, congruence
     - Horizontal gene transfer
  3. Gene modeling & discovery
     - Transcript-genome alignments
     - Hierarchical Markov Models
  4. Genome assembly & rearrangements
  5. Monte Carlo methods
  6. Others...

- **GRADING:**
  - The grades will be based on class participation, homework sets, and one to three major projects (projects 60 to 80 percent).

- **STUDENTS WITH DISABILITY:** Any student with a documented disability needing academic adjustments or accommodations is requested to speak with me during the first two weeks of class. All discussions will remain confidential. Students with disabilities will need to also contact Disability Support Services in the Ley Student Center.